



PIER Energy-Related Environmental Research

Environmental Impacts of Energy Generation, Distribution and Use

West Coast Regional Carbon Sequestration Partnership: Phase I Terrestrial Characterization

Contract #: 500-02-004 (MR-021)

Contractor: California Institute for Energy and Environment (CIEE)

Amount: \$351,000 (part of a \$1,010,097 WESTCARB Phase I agreement)

Contract Project Manager: Carl Blumstein

Commission Project Manager: Guido Franco

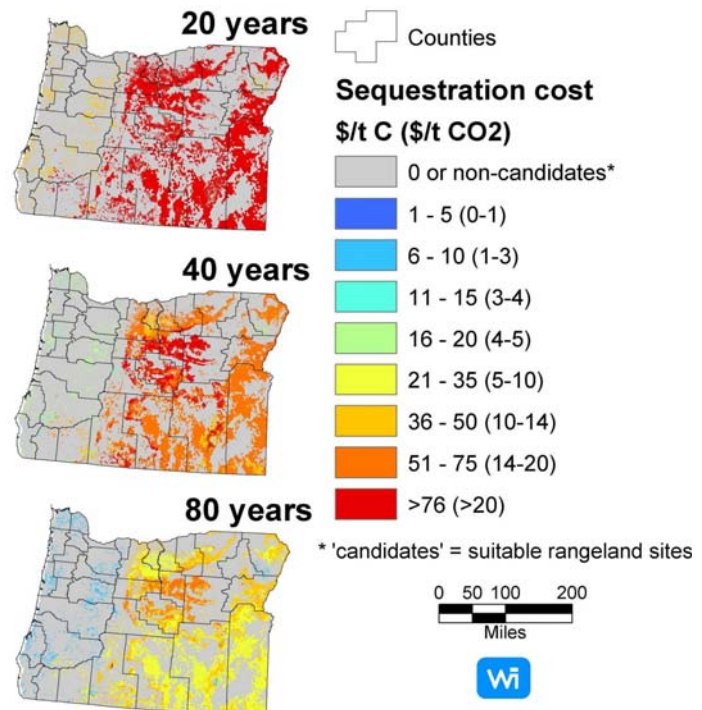
Commission Contract Manager: Beth Chambers

Project Term: 2004–2005

The Issue

Reducing human-made carbon dioxide (CO₂) emissions is a complex challenge requiring multiple solutions; one near-term solution is terrestrial carbon sequestration. Terrestrial carbon sequestration involves changing the management of forests, rangelands, agricultural lands, and wetlands to either remove more CO₂ from the air or reduce CO₂ emissions from these ecosystems. To determine where and how terrestrial sequestration projects can best be implemented in different regions, it is necessary to evaluate the potential of these projects, including development of carbon baselines and carbon-supply curves, and identification of potential terrestrial sequestration pilot sites.

Led and co-funded by the California Energy Commission, the West Coast Regional Carbon Sequestration Partnership (WESTCARB) is one of seven partnerships that have been established by the U.S. Department of Energy (DOE) to evaluate carbon sequestration technologies best suited for different regions of the country. The WESTCARB region includes the states of California, Alaska, Arizona, Nevada, Oregon, and Washington, and the Canadian province of British Columbia.



Costs of carbon sequestration through afforestation of suitable rangelands, Oregon. (\$/t C = U.S. dollars per metric ton carbon; \$/t CO₂ = U.S. dollars per metric ton carbon dioxide)

Project Description

WESTCARB's Phase I terrestrial sequestration research assessed the baseline of changes in carbon stocks on agricultural lands and in forests in Arizona, Oregon, and Washington for the 1990s to estimate the emissions and removals of greenhouse gases attributable to changes in the use and management of land. These baselines are useful for enhancing carbon stocks and/or reducing carbon sources to potentially mitigate GHG emissions. Researchers determined the amount of terrestrial sequestration available in these states and estimated the cost of this type of carbon sequestration over different time frames.

PIER Program Objectives and Anticipated Benefits for California

This work supports California's goal to support the most cost-effective and environmentally sound strategies, including consideration of global climate change, as recommended in the Integrated Energy Policy Report (IEPR) 2005, by:

- Taking a leadership role in developing technologies that capture and store CO₂.
- Continuing research performed by the California Climate Change Center in evaluating the economic and ecological consequences of climate change and adaptation and mitigation strategies to preserve and improve quality of life.
- Implementing all strategies identified by the Climate Action Team as needed to meet the governor's greenhouse gas emission reduction goals, including recommendations developed as part of the 2005 IEPR.
- Participating in public outreach efforts to educate the public and businesses in California on climate change impacts and on actions to mitigate emissions and encourage stakeholder participation in the development of programs to meet California's climate change goals.

Results

Assessment of the changes in carbon stocks in agricultural lands showed that Washington, Oregon, and Arizona were CO₂ sources during the 1990s. Over the same period, forest carbon stocks decreased in Washington, but increased in Oregon and Arizona. Results of the terrestrial supply curve analyses showed that afforestation of rangelands and crop lands offer major sequestration opportunities; at a price of \$20/metric ton (tonne) CO₂, more than 1,233 million tonnes of CO₂ could be sequestered over 40 years in Washington, and more than 1,813 million tonnes of CO₂ could be sequestered in Oregon. Researchers collected data that will allow the forecasting of business-as-usual projections of carbon stocks, and developed a web-based, state-by-state compilation of current regulations relating to land-use changes.

WESTCARB findings are reported via widely used geographic information system data formats (www.westcarb.org/carbonatlas.htm). The U.S. Department of Energy has combined WESTCARB results with those from other regional partnerships to create NatCarb, a national carbon atlas (www.natcarb.org/ims.html). WESTCARB research results have also been published in DOE's *Carbon Sequestration Atlas of the United States and Canada*, available online at http://www.netl.doe.gov/publications/carbon_seq/refshelf.html.

For more information on WESTCARB projects, visit www.westcarb.org.

Final Report

PIER-EA staff intend to post the final reports on the Energy Commission website in summer 2007 and will list the website link here.

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